

REMARKS

Reconsideration is requested.

Claims 1-17 are pending.

Claims 1-4 have been revised, without prejudice, to recite that the supports of the claims are nanometric and/or micrometric-sized composite reinforcement supports. The claim revisions are supported, for example, by paragraphs [0006]-[0018] of the U.S. Patent Office published version of the specification. Claims 12 has been revised as an independent claim to further state the "multiscale product". Support for the revisions is believed to be available throughout the specification. No new matter has been added.

The following Section 103 rejections based on Saitoh (U.S. Patent Application Publication No. 2006/0052509), are traversed as Saitoh is not citable against the present application: the Section 103 rejection of claims 9 and 10 over Rao (Material Research Innovation 1998; 2:128-141), Wang (U.S. Patent Application Publication No. 2003/0119920) and Saitoh (U.S. Patent Application Publication No. 2006/0052509).

The cited Saitoh (U.S. Patent Application Publication No. 2006/0052509) document is not citable against the present application as the publication is a U.S. national phase of a PCT application which was published in Japanese. The reference therefore does not have a citable date under Section 102(e). The reference is citable as of the March 9, 2006 date of the U.S. Patent Office publication. The present application is based on a PCT international application filed January 21, 2005 and claims benefit to French applications filed in January and April of 2004. Withdrawal of the Section 103 rejection based on Saitoh is requested.

For completeness, the applicants note that the cited Saitoh document was also believed to have been published as WO 2004/039893 on May 13, 2004. The attached certified English translation of the priority documents are submitted to antedate WO 2004/039893.

The Section 102 rejection of claims 1-8, 11 and 15 over Singh (Chemical Physics Letters 2003; 372:860-865) “in view of” Rice (U.S. Patent No. 5,770,099) and Heaney (“Quartz”, in AccessScience@McGraw-Hill, accessed on 6 January, 2010), is obviated by the above amendments. Specifically, the quartz flakes of the Singh reference are not included in the claimed invention because they are not composite reinforcement materials. The quartz flakes of the Singh reference are made manually by scratching a large quartz substrate with a diamond scribe (see Singh et al., page 861, 2nd column), or by ball-milling a large quartz substrate resulting in much thicker and larger substrates than the scratched material (id.). This type of artisanal quartz flakes having non-uniform irregular shape and size are not and cannot be used as composite reinforcement materials. The quartz flakes from the cited reference are therefore submitted to be specifically excluded from the claimed invention by the recitation of “composite reinforcement supports” in the claims. Entry of the present Amendment will at least reduce this issue for appeal. Entry of the Amendment and withdrawal of the rejection are requested.

The Section 102 and Section 103 rejections of claim 11 over Ma (Journal of Materials Science Letters 2000; 19:1329-1931), will be moot upon entry of the present

Amendment. Entry of the present Amendment will at least reduce these issues for appeal.

The Section 103 rejection of claim 12 over the combination of Ma and Andrews (Current Opinion in Solid State and Materials Science 2004; 8:31-37), is traversed.

Reconsideration and withdrawal of the rejection are requested in view of the above and the following distinguishing comments.

The applicants submit that Ma teaches a process for growing carbon nanofibers onto porous carbon nanotube pellets. First, the resulting product is carbon nanofibers having one extremity bound to the surface of carbon nanotube pellets. In contrast, in the claimed composite material, the carbon nanotubes are grown onto nanometric and/or micrometric-sized composite reinforcement supports, that is, one extremity of carbon nanotubes is bound to the surface of the nanometric and/or micrometric-sized composite reinforcement supports.

Second, the applicants submit that Ma's nanofibers ranges from 50 to 300 nm in diameter. Most are about 100 nm in diameter (see Ma, page 1930, 1st column). The carbon nanotube pellets are 10 mm x 10 mm x 1 mm (see Ma, page 1929, 1st column). Thus, the applicants submit that the carbon nanofiber/carbon nanotube pellet product disclosed in the Ma reference is at most a nanoscale/millimeterscale product. In other words, it does not amount to the claimed nanoscale/microscale reinforcement material.

The Andrews reference is understood to be relied upon by the Examiner for teaching that adding carbon nanotubes or carbon fibers to polymer matrices is desirable. However, Andrews does not teach a reinforcement material consisting

essentially of carbon nanotubes grown on nanometric and/or micrometric-sized composite reinforcement supports.

Both of the cited references lack at least a disclosure of a reinforcement material consisting essentially of carbon nanotubes grown on nanometric and/or micrometric-sized composite reinforcement supports. Claim 12 therefore would not have been obvious in view of the combination of cited art.

Withdrawal of the Section 103 rejection is requested.

The Section 103 rejection of claims 1-8, 15 and 16 over Rao (Material Research Innovation 1998; 2:128-141), and Ma is traversed. Reconsideration and withdrawal of the rejection are requested in view of the following distinguishing comments.

Rao teaches the growth of carbon nanotubes in a quartz tube (see figure 1), but not on nanometric and/or micrometric-sized composite reinforcement supports. The quartz tube has an internal diameter of 10 mm or 25 mm (Figure 1). Its length is much larger than its internal diameter (Figure 1). Thus, the support on which the carbon nanotubes are grown is not a nanometric and/or micrometric-sized support.

The cited Ma document teaches a hot-press process comprising mixing carbon nanotubes and SiC powder together, and heating the mixture at high temperature to make a ceramic. There is no teaching in the cited Ma document of the growth of carbon nanotubes on nanometric and/or micrometric-sized supports.

Both of the cited references lack at least a disclosure of contacting a nanometric and/or micrometric-sized composite reinforcement supports with a mixture of carbon

source compound and a catalyst. The claims therefore would not have been obvious in view of the combination of cited art.

Withdrawal of the Section 103 rejection is requested.

The Section 103 rejection of claims 1-4 over Rao in view of Wang (U.S. Patent Application Publication No. 2003/0119920), is traversed. Reconsideration and withdrawal of the rejection are requested in view of the following distinguishing comments.

Rao teaches the growth of carbon nanotubes in a quartz tube (see figure 1), but not on nanometric and/or micrometric-sized composite reinforcement supports. Thus, the cited reference at least lacks a disclosure of contacting a nanometric and/or micrometric-sized composite reinforcement support with a mixture of carbon source compound and a catalyst.

Wang teaches seeding catalyst particles on a porous support material (e.g., foam, felt, mesh, membrane and honeycomb (see ¶[0041] of the Wang reference), and then exposing the seeded support to a carbon source in a gaseous state to grow carbon nanotubes on the support. Thus, the cited reference lacks at least a teaching or suggestions of contacting a nanometric and/or micrometric-sized composite reinforcement supports with a mixture of carbon source compound and a catalyst.

Both reference lack a teaching or suggestion of at least contacting a nanometric and/or micrometric-sized composite reinforcement supports with a mixture of carbon source compound and a catalyst.

The claimed invention would not have been obvious in view of the cited combination of art. Withdrawal of the Section 103 rejection is requested.

The Section 103 rejection of claim 12 over Singh (Chemical Physics Letters 2003; 372:860-865), Rice (U.S. Patent No. 6,770,099), Heaney and Andrews (Current Opinion in Solid State and Materials Science 2004; 8:31-37), is traversed. Reconsideration and withdrawal of the rejection are requested in view of the above comments relating to Singh and Andrews and the following. The cited combination of art lacks a teaching or suggestion of at least a reinforcement material consisting essentially of carbon nanotubes grown on nanometric and/or micrometric-sized composite reinforcement supports. Claim 12 therefore would not have been obvious in view of the cited combination of art and withdrawal of the Section 103 rejection is requested.

The Section 103 rejection of claims 1-4 and 13 over Rao and Saito (U.S. Patent No. 6,979,433), is traversed. Reconsideration and withdrawal of the rejection are requested in view of the above comments relating to Rao and the following. The Saito reference is understood to be relied upon for teaching wire mesh nanotube collectors. The Saito reference discloses a Ni-Cr wire collecting element between about 0.4 and 1.0 mm in diameter (see Saito column 3, line27). The reference is not believed to be relevant to a nanometric and/or micrometric-sized composite reinforcement support. Accordingly, the applicants believe that neither of the cited references contain at least a disclosure of a nanometric and/or micrometric-sized composite reinforcement support.

The claims therefore would not have been obvious in view of the combination of cited art and withdrawal of the Section 103 rejection is requested.

The Section 103 rejection of claims 1, 5 and 14 over Singh, Smalley (WO 00/17102) and Maruyama (Chemical Physics Letters 2002; 360:229-234), is traversed. Reconsideration and withdrawal of the rejection are requested in view of the above and the following distinguishing comments.

The deficiencies of Singh are discussed above. The reference does not teach growing/binding carbon nanotubes on composite reinforcement supports.

Smalley and Maruyama are being relied upon by the Examiner for the teaching that an alcohol can be used as a carbon source compound. This does not cure the deficiencies of Singh. The applicants submit however that the cited references lack at least a teaching of contacting nanometric and/or micrometric-sized composite reinforcement supports with a mixture of carbon source compound and a catalyst.

The claimed invention would not have been obvious in view of the cited combination of art. Withdrawal of the Section 103 rejection is requested.

The claims are submitted to be in condition for allowance and a Notice to that effect is requested. The Examiner is requested to contact the undersigned, preferably by telephone, in the event anything further is required.

BAI et al.
Appl. No. 10/587,546
Atny. Ref.: 5006-11
Amendment After Final Rejection
June 18, 2010

Respectfully submitted,

NIXON & VANDERHYE P.C.

By: /B. J. Sadoff/
B. J. Sadoff
Reg. No. 36,663

BJS:
901 North Glebe Road, 11th Floor
Arlington, VA 22203-1808
Telephone: (703) 816-4000
Facsimile: (703) 816-4100